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| EXAMINER | | | | |
| WALERIC CHARLES | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/750,583

Applicant(s)

JIANG ET AL.

Examiner

ERIC C. WAI

Art Unit

2195

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3, 6, 7 and 11-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 6-7, and 11-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. Claims 1, 3, 6-7, and 11-21 are presented for examination.
2. In view of the Appeal Brief filed on 08/21/2009, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below. To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140

F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thornton*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 3, 6-7, and 11-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 12-13, 19-22, 26-27, and 33-34 of copending Application No. 10/750,589. Although the conflicting claims are not identical, they are not patentably distinct from each other.
5. For example, claim 1 of copending Application No. 10/750,589 recites placing a thread in an inactive state in response to a predetermined condition and sending a message from a semaphore to change the state of the thread. Claim 11 of the present application performs the substantially the same steps. Claim 1 of copending Application No. 10/750,589 differs only in that the threads are intended to be used to process graphical elements of an image. It would have been obvious to one of ordinary skill to try to extend the teachings to image processing.
6. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The following terms lack antecedent basis in the claims:

i. Claim 17 line 2, "the semaphore acknowledge message".

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 3, 6, 15 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Joffe et al. (US Pat No. 6,978,330)

10. Regarding claim 1, Joffe teaches a method comprising:

placing an executable thread of instructions in an inactive state in response to a resource being unavailable (col 2 lines 54-58, wherein Task1, Task2, Task3 are suspended while Task0 has been granted the semaphore in order to access a memory location); and

when the resource becomes available, changing the thread of instructions to the active state and granting the resource to the thread of instructions (col 2 lines 51-65, wherein a task is awakened from sleep and wherein tasks must be granted access to semaphore in order to access the memory location).

11. Regarding claim 3, Joffe teaches executing the thread of instructions when in the active state (col 2 lines 51-65, wherein Task0 must be in an active state in order to execute instructions).

12. Regarding claim 6, Joffe teaches maintaining an indication of a state of each of a plurality of executable threads of instructions (col 2 lines 51-65, wherein it is inherent that Joffe maintains an indication on the state of each thread in order to change them from the wait state).

13. Regarding claim 15, Joffe teaches a system comprising:

a memory controller (col 2 lines 40-44, wherein it is inherent a memory controller exists to access shared memory); and

an execution circuit coupled with the memory controller to receive and execute a thread of instructions (col 2 lines 44-58, wherein tasks are executed by a microcontroller), wherein the execution circuit transmits a request message (col 2 lines 51-53, wherein tasks make requests to semaphores) and places the thread in an inactive state in response to the thread of instructions requiring a resource that is unavailable (col 2 lines 54-58, wherein tasks are suspended when a semaphore is held by another thread), said execution unit to automatically change the thread of instructions to an active state (col 2 lines 58-60, wherein the task is awakened from sleep in order to access the resource) and grant the resource to the thread of instructions when the resource becomes available (col 2 lines 51-53, wherein tasks are granted the semaphore).

14. Regarding claim 18, Joffe teaches that when the thread of instructions is in the inactive state, execution of the instructions ceases and the execution circuitry does not poll the semaphore entity to determine a status of the semaphore request message (col 2 lines 54-58, wherein it is inherent that suspended tasks do perform any functions).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 7 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joffe et al. (US Pat No. 6,978,330).

17. Regarding claim 7, Joffe does not teach that the indication of the state of each thread comprises a state variable corresponding to a dependency, if any, of an associated thread.

18. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Joffe to include a state variable corresponding to a dependency of an associated thread. Joffe teaches that each thread is dependent on the use of the semaphore/resource for operation. Joffe also teaches the need to synchronize communications among threads (col 2 lines 40-44). One would be motivated by the desire to prohibit out of order accesses to resources that could cause system conflicts.

19. Regarding claim 16, Joffe does not teach further comprising: at least one additional execution circuit to execute threads of instructions; and a thread dispatcher coupled with the execution circuit and at least one additional execution circuit to dispatch threads for execution by selected execution circuits.

20. It would have been obvious to one of ordinary skill in the art, at the time of the invention to add one additional execution circuit to execute threads of instructions and a thread dispatcher. It is well known in the art to add additional execution units to increase processing capability of processors.

21. Regarding claim 17, Joffe does not teach that the execution circuitry, in response to receiving the semaphore acknowledge message, resumes execution of the thread of instructions including accessing the resource associated with the semaphore.

22. Joffe does teach that once the semaphore is granted to another thread, the thread is awakened from sleep and can access the resource associated with the semaphore (col 2 lines 58-63). It would have been obvious to one of ordinary skill in the art at the time of the invention to try to modify Joffe to teach using a semaphore acknowledge message. One would be motivated by the desire to include some way of indicating the granting of a semaphore.

23. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wenniger (US Pat No. 6,018,785).

24. Regarding claim 11, Wenniger teaches an apparatus comprising:

an execution circuit to receive and execute a thread of instructions, wherein the execution circuit transmits a semaphore request message and places the thread in an inactive state in response to the thread of instructions requiring a resource having an associated semaphore (col 6 lines 12-22, wherein the requesting process must await an interrupt from the semaphore); and

a semaphore entity coupled with the execution circuit to receive the semaphore request message from the execution circuit and to selectively grant control of the semaphore in response to the semaphore request message by transmitting a semaphore acknowledge message to the execution circuitry, wherein the execution circuitry, in response to receiving the semaphore acknowledge message, removes the thread of instructions from the inactive state and grants the resource to the thread when the resource becomes available (col 6 lines 12-22, where upon receiving the interrupt, the thread queries the semaphore; col 6 lines 40-42, wherein the resource is granted).

25. Wenniger does not explicitly teach that the thread of instructions is placed in an inactive state. Wenniger only teaches that the thread awaits the interrupt from the hardware semaphore. However, it would have been obvious to one of ordinary skill in the art at the time of the invention, that the thread would be placed in an inactive state. It is well known in the art that threads are stalled when the resources that they require are unavailable. One would be motivated by the desire to reduce idle execution time of threads awaiting resources as is well known in the art.

26. Regarding claim 12, Wenniger does not teach further comprising: at least one additional execution circuit to execute threads of instructions; and a thread dispatcher coupled with the execution circuit and at least one additional execution circuit to dispatch threads for execution by selected execution circuits.

27. It would have been obvious to one of ordinary skill in the art, at the time of the invention to add one additional execution circuit to execute threads of instructions and a

thread dispatcher. It is well known in the art to add additional execution units to increase processing capability of processors.

28. Regarding claim 13, Wenniger teaches that the execution circuitry, in response to receiving the semaphore acknowledge message, resumes execution of the thread of instructions including accessing the resource associated with the semaphore (col 6 lines 12-22).

29. Regarding claim 14, Wenniger teaches that when the thread of instructions is in the inactive state, execution of the instructions ceases and the execution circuitry does not poll the semaphore entity to determine a status of the semaphore request message (col 6 lines 6-12).

30. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joffe et al. (US Pat No. 6,978,330) in view of Winkeler et al. (US Pat No. 7,237,013).

31. Regarding claim 19, Joffe does not teach placing requests for a semaphore in a queue.

32. However, Winkeler teaches a well known technique of creating a semaphore queue to queue pending requests (col 10 lines 39-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Joffe to teach placing

requests for a semaphore in a queue. One would be motivated by the desire to keep track of processes that desire access of the resource by queuing them.

33. Regarding claim 20, Joffe teaches causing a thread to release a semaphore when use of a resource is completed (col 2 lines 62-63).

34. Regarding claim 21, Winkeler teaches automatically granting the resource to the thread whose request is the next request in the queue (col 10 lines 45-47, wherein each component can obtain the lock "in turn").

Response to Arguments

35. Applicant's arguments with respect to claims 1, 3, 6-7, and 11-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric C. Wai whose telephone number is 571-270-1012. The examiner can normally be reached on Mon-Thurs, 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng - Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/
Supervisory Patent Examiner, Art Unit 2195

/Eric C Wai/
Examiner, Art Unit 2195